

Self-aligned 2-bit "Double Poly CMP" flash memory cell

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The present invention relates to a method as defined in the preamble of claim 1. Also, the present invention relates to a Flash memory cell manufactured by means of such a method. Further, the present invention relates to a semiconductor device comprising at least one such Flash memory cell.

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Compact memory cells are believed to be the next step towards higher density Flash memories (non-volatile memory cells, NVM cells). Such compact cells are known from US 5,414,693 (and related US 5,364,806 and US 5,278,439), which describes a self-aligned dual-bit split gate (DSG) FLASH EEPROM cell and a method to manufacture such a cell.

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However, such prior art compact cells suffer from the fact that the bit-lines of the Flash memory cells consist of buried (non-silicided) diffusions with relatively high electrical series resistance. To reduce the overall resistance of such bit-lines, the compact cells from the prior art require "strapping" of the bit-lines by a metal line.

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Moreover, the formation of a buried diffusion in an embedded NVM cell manufacturing process requires an additional process-module. Disadvantageously, such a process module may be difficult to integrate in this embedded NVM cell process, as is known to persons skilled in the art.

A further disadvantage of the compact cells from the prior art is the layout of the control gate lines and select gate lines, relative to the buried bit-lines. The control gate lines run parallel to the bit-lines in a direction perpendicular to the direction of the select gate lines, which adversely influences the addressing scheme of a memory array of such compact cells.

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Furthermore, lithographic processing of the compact cells from the prior art is complex due to lithographic processing of the implantation mask that keeps the bit-line diffusion implants out of the region between the two floating gates of a DSG cell. Such processing is difficult due to the local topography. To suppress interference in the resist during the exposure of a mask, usually an organic bottom anti-reflective coating (BARC)

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